Summarized below are EPA's comments on the LWG's presentation materials from the EPA/LWG December 14, 2010 meeting at the Sheraton Portland Airport. Comments are organized by general observations and then by the four topic areas that were covered in the LWG presentations.

GENERAL OBSERVATIONS

- EPA provided initial feedback on the LWG presentation and Feasibility Study (FS) issues in our December 21, 2010, letter to the LWG. EPA was disappointing that the December 14 presentations did not provide all of the previously agreed to elements, including the FS Tools and the Screening of Alternatives.

- The material provided seemed to be randomly selected. It did not describe how response actions, technologies, and process options would be or had been identified and selected for the Areas of Potential Contamination (AOPCs).

- No information was provided on monitored natural recovery (MNR), institutional controls, or modeling which are all important for response action/technology development and evaluation. Conversely, the information that was provided on specific technologies, like capping, was so limited and issue-focused that the broader aspects of implementability, effectiveness, and cost were lost.

- The presentation and discussion on sensitivity/uncertainty analysis was not well-developed or convincing, and was not presented in such a way as to allow for meaningful feedback. It was not clear how the information would be used, presented, or enhance decision-making in the FS. Please note our initial feedback on this topic in EPA's December 21, 2010 letter and additional comments below on this subject.

TOPIC (SLIDE)-SPECIFIC OBSERVATIONS

1. Preliminary Capping Chemical Isolation Evaluation

Summary Observations

- The material presented by LWG dealt primarily with the evaluation of acceptability of capping based on the upwelling of contaminants from sediments into and through cap materials. This analysis is not appropriate as a primary screening tool. The primary concern regarding the suitability of capping is whether site conditions are conducive for that technology; i.e., shear stress (erosion potential), slope, presence of NAPL, and whether water depth and anticipated uses will accommodate capping. The typical purpose of caps is chemical isolation. The primary risk driver over much of the Lower Willamette is PCB contamination which is effectively isolated by caps when their design is sufficient and their integrity is maintained. Upwelling is a secondary issue which for some reason has received primary focus. These types of models are best suited for cap design to evaluate whether they will be effective in upwelling areas with mobile contaminants. Applying the models over large areas to evaluate whether PCB concentrations are "cap-able" is not helpful. These types of analyses can be helpful to model the suitability of cap design in contaminated groundwater discharge or NAPL areas that advect PAHs.

- Without a sensitivity analysis or other breakdown of the source of various results, it is difficult to verify if the "Region 10 Application Points" generate capping concerns by LWG or if it is other factors.

- The analysis justifies a closer consideration of options in the cap design, such as the use of amendments. These are "process options" and are normal considerations during technology screening. The analysis presented does not provide a justification for full removal of capping as a technology in many areas.

- Preliminary alternatives using capping in many areas claimed to be uncappable should be developed for, at a minimum, consideration in initial alternative screening when effectiveness, implementability, and cost comparisons are made between various alternatives.

Slide-specific Comments

Slide No.	Issue/LWG Statement	Comment
2	Objective of presentation is to screen potential capping areas for chemical isolation effectiveness, conclusion is reached that "capping is a viable site-wide technology in terms of effectiveness"	The remedial action/technology/process option development is described in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (1988). As outlined in that guidance, the first step in alternative screening is to identify General Response Actions (GRAs) that logically apply to an area of concern, as established by the Remedial Action Objectives. For example, "containment" is the GRA associated with leaving material in place and preventing the material or its contaminants from migrating. GRAs are established based on the logic of the problem that has been defined. Technology types that are relevant within a GRA, such as capping for areas where containment is a GRA, are then identified. Technology types are eliminated that are not technically implementable, which primarily means they do not make sense for the area of concern. Within the selected technology types, process options are then identified and screened on the basis of effectiveness, implementability, and cost. The intent of the process option screening is to select process options that best represent a technology type in terms of balancing effectiveness, implementability and cost. In some cases process options might be selected—for example, using an organically amended cap—because they may provide a better balance. Alternatives are then assembled based on the selected GRAs (and their representative process options) and screened based on effectiveness, implementability, and cost. The presentation seems to be suggesting that a broad class of technology, capping, and presumably an entire GRA, must be eliminated during the technology screening phase, without considering various process options and without performing a relative comparison of alternatives using the capping technology against other alternatives. This approach is not consistent with EPA guidance.
4	Approach is consistent with EPA comments on CDF performance standards	It should be noted that although the 2007 draft 60% Design Report for the T4 CDF describes a compliance point for water quality criteria, the standards were not finalized. In fact, the report notes specifically that "Final Applicable Relevant and Appropriate Requirements (ARARs) related to surface water will not be established for the Portland Harbor Superfund Site until the time of the ROD".
	Guidance-based approach is protective and consistent with EPA sediment remediation guidance	Compliance points typically are set based on the results of FS and the ROD and associated documents. Because of the requirement that ARARs be "substantively met or waived," some compliance points are established as the result of the ARARs consideration. The national guidance contains no specific requirement for how or where to specify "compliance" for any particular remedy, only that compliance must be determined or waived as part of the CERCLA action. It is inaccurate to state that "Guidance-based approach is protective etc." at this point, or to imply that the Region 10 performance standards are "overly" protective.
5	Optional armor layer and compliance point	We note the following from the national guidance: "…caps are generally designed to fulfill three primary functions: physical isolation, stabilization/erosion protection, and chemical isolation. In some cases, multiple layers of different materials are used to fulfill these functions, and in some cases, a single layer may serve multiple functions. Project managers are encouraged to consider the use of performance-based measures for caps in remedy decisions to preserve flexibility in how the cap may be designed to fulfill these functions." It is unclear whether the LWG has considered anything further than a single layer/single material approach which their analysis suggests might be ineffective in this instance. Commentary at the meeting emphasized the overly-simplistic nature of the analysis, suggesting that upwelling and organic cap amendments were not appropriately considered.
	Compliance point for chronic AWQC	EPA does not agree that the point of compliance for chronic AWQC should be "surface water concentrations immediately above the sand cap". That point of compliance is not

Slide No.	Issue/LWG Statement	Comment
		necessarily protective of burrowing benthos.
5-7	Water column criteria	The evaluation that compares contaminant flux over an area to a surface water concentration is not realistic. This is a fast flowing river of considerable depth (in places); an estimate of contaminant concentration integrated over the water column due to flux through a cap area is not helpful or useful to pursue. Unless there were extreme circumstances pumping large quantities of soluble chemicals into surface waters, the analysis would not indicate potential effects and it does not need to be further developed.
6	People consuming fish over large areas	DEQ has found from the pan-fishers that sometimes people catch and consume fish in Portland Harbor fish from very localized & consistently used areas (that's because that's where the fish are and/or that's where the ready access is).
9	Two-phase evaluation approach	The evaluation approach, which basically says unfavorable results from the first phase of analysis may require a more refined second phase, is fine. That second phase would coincide with the selection of process options during the alternative development where technology refinements are selected. Failure at the first phase should only imply that, for a first cut, the conservative estimates or assumptions about cap design need to be looked at more closely.
	Conservative approach to evaluating cap effectiveness	Many of the contaminants that drive risk in Portland Harbor are highly toxic and extremely persistent—consequently it is prudent to make conservative assumptions about cap effectiveness.
11	Steady-state model	Use of the Reible model as a critical determinant of capability seems inappropriate. The model results offer useful insight to EPA that a 12-inch pure sand cap may be ineffective. The follow-on argument that the cause of this ineffectiveness is the performance standard/criteria that Region 10 requested the LWG to use is premature.
12	Use of zero biodegradation rate	It would be useful, in reviewing conclusions, to see the results of a sensitivity analysis on the parameters. As presented, it is difficult to isolate the impact on the results based on each variable that was chosen for analysis.
		Assuming a non-zero degradation rate for contaminants such as PCBs, which will have the effect of decreasing concentrations over time so that eventually there is no potential for water quality violations, would need to be adequately supported. The sediments in question have been subject to degradation for decades, often at the sediment-surface water interface where the potential for degradation is likely higher than would be the case for capped sediments that are isolated from much biological, light, and other agents that promote degradation.
9, 13	Depositional velocity	Deposition of material on the cap surface following its placement was not considered in the cap model. It was stated that this assumption was "conservative". This is not necessarily true. If contaminated material is deposited on top of the cap, it will contribute to porewater contaminant concentrations. Considering the peculiar focus on the ebullition of PCBs (which migrate to minimal extent in water), deposition of sediments would be a strong determinant of surface sediment porewater concentration.
16	Screening results	"EPA Region 10 Phase 1 conservative screening level approach identifies large areas where typical capping would not meet EPA criteria." The implication is that the guidance-based approach should be used. But first, it is important that some sensitivity analysis be conducted to determine what is driving the findings. The conclusion merely suggests that a more nuanced process option refinement might be needed, and that some areas may require more than just simple non-armored, non-amended caps. Additionally, this conclusion is based on the use of the Reible model, which, as we have noted previously, is inappropriate for technology screening.
		The modeling that was presented did not include the presence of a reactive layer in the cap geometry, which would make the caps more effective. As they indicated, the analysis was preliminary. It is likely that a more detailed analysis can identify areas that are "cappable" with a more robust design.
21	Phase 2 evaluations	The results of the Phase 2 work should be shared. How the results led to the conclusion that capping is a viable site-wide technology (which means it meets the first step in evaluating the technology implementability) should be presented.
22	Comparison to other sites	Similar concerns to those noted previously. If the other sites reached their conclusions at the end of the FS when many factors and tradeoffs were considered, their end results

Slide No.	Issue/LWG Statement	Comment
		may not be comparable to the early stage screening analyses being developed for the FS.
23	Conclusions	For reasons noted above, we disagree that caps should be screened out for large site areas.

2. Preliminary Methods for Volume Determinations

Summary Observations

- If this type of analysis is to be pursued, its ultimate purpose should be clarified. The analysis resulted in various determinations (no dredging around structures) and rules (maximum dredging depths). Are these determinations strictly for dredge volume determination or will they be used to screen potential remedies? Slide 2 (the objective) indicates the former; slide 38 states that "demolition/reconstruction of structures [an option associated with dredging] can be pre-screened" which indicates the latter. Simplifying assumptions and rules are fine to estimate dredge volumes; but such processes are too simplistic to rely on for remedy selection.

- As noted above, it is not clear if the proposed screening related to docks/structures is strictly for initial harbor-wide volume determination or if such screening would carry through the entire FS. If such dredging is screened out in the FS, it is not clear if this topic would be re-evaluated during remedial design.

- The topics for dredge volume determination were presented in a hypothetical sense – that is, the total volume of sediment exceeding screening values was not presented, the volume or area of sediment that might be excluded from dredging was not presented, and the volume of the adjustment factor was not presented. As such, it is difficult to evaluate the approach; this is an instance where more detail is needed.

- It is inappropriate in technology screening and alternatives development to remove from consideration process options, such as dredging under structures, strictly because the activity is cost-prohibitive. Process option selection and alternatives screening is based on implementability, effectiveness, and cost. For example, in areas where elevated concentrations of highly toxic or mobile contaminants exist, considered to be "Principle Threats" in the NCP, treatment is an expectation expressed in the NCP. Consideration of dredging in Principle Threat areas should be made in the FS, regardless of the presence of structures.

Slide-specific Comments

Slide No.	Issue/LWG Statement	Comment
2	Demolition/reconstruction is cost prohibitive	The discussion offered for slide 2 in the previous package outlines the technology and process option screening process. For areas that warrant the consideration of dredging, the GRA is removal. Technologies are removed because they don't apply to the problem, but not because they are cost prohibitive. Process options are then selected to represent the technologies, and they are chosen based on a weighing of effectiveness, implementability, and cost. Although there may be areas where certain process options are difficult and costly to implement, if the process option is highly effective and if the problem in the area warrants consideration, the process options should be retained and used for alternatives development.
		Demolition/reconstruction of structures can be expensive; however, demolition/reconstruction may be necessary to remediate specific highly contaminated situations. Additionally, many waterfront structures are in poor to dilapidated condition. Rehabilitation and/or replacement of unusable or dangerous structures can be accommodated as part of actual remediation, and EPA has observed at other

Slide No.	Issue/LWG Statement	Comment
		Superfund sites that owners may be willing or even anxious to do this. We agree with the first and third bullets, particularly the third that states: "Engineering factors can be considered and added to provide a reasonable estimate of volumes suitable for an FS-level determination" of volume. We believe the second bullet is unnecessary and inappropriate.
4	Volume determinations cannot be made at this time because of the uncertainty analysis being conducted	The sensitivity analyses being conducted may enhance understanding uncertainties associated with volume calculations, but the analyses should not prevent the development of volume estimates. Ideally the sensitivity analyses will improve understanding uncertainties that are present and can then improve the evaluation of alternatives by providing more information. Discussion of uncertainties can be qualitative (usually at the FS level) or quantitative (as remedial designs become more specific and detailed.
5 - 7	Thiessen Polygons	As the dredge design matures to an actual dredge plan, surface bathymetry needs to be more obviously considered. As an initial screen however, the approach presented appears adequate.
15-16, 19	"Pre-screen evaluation"	It is too early to conclude that costs are necessarily "excessive", "prohibitive" or "disproportionate". This is the purpose of the FS itself. Rather than simply eliminate from further consideration dredging alternatives that cost more than less intrusive remedies, it is expected that that both options may be developed where appropriate so the relative tradeoffs of effectiveness versus implementability and cost can be considered.
18	Typical light structures	Presumably abandoned pilings do not qualify as light structures.
19-20	Demolition and dredging costs	The unit costs presented appear to be high; insufficient details are provided to validate the costs.
20	Diver assisted dredging	The LWG should consider focused driver-assisted dredging in hot-spot areas not amenable to traditional dredging options (e.g., around docks).
21-23	Where structures cannot be easily removed the cost for demolition and replacement is disproportionate	Alternatives are screened based on effectiveness, implementability, and cost. In areas where structures cannot be easily removed, but where it is necessary to consider the effectiveness of removal due to the nature of the contaminants, alternatives that include structure removal and replacement should be included.
22	The disproportionate cost conclusion also applies to dilapidated structures	The three sub-bullets are substantively in conflict with the major bullet. Also, the requirement to at least gather intelligence and make educated estimates of dilapidated structures that might be integrated with subsequent remediation should be an integral component of any FS. Rules or allowances for such upgrades to waterfront structures are expected to be included in the final remedy.
		There are a number of dilapidated docks in Portland Harbor that should be repaired or removed. They often pose a safety hazard & an overwater source of contamination. An example is the unused, unsafe, dilapidated dock at the downstream portion of the Gunderson site.
23 - 31	Rules developed …	In concept, the formulation of these rules is useful for defining how screening and alternative remedy formulation volumes are estimated. It would be expected that these rules would be revisited and appropriate adjustments made on individual SMAs in remedial design.
		While it seems plausible that it would not make sense to remove some structures that are particularly substantial, it is inappropriate to make such exclusions using a "rule-based" approach. It would be more prudent to evaluate each structure on a case-by-case basis.
		Dredging around docks/structures should not be screened out over large portions of the site with high levels of contamination. Rather than using a harbor-wide rule to screen docks/structures out, this determination should be made a SMA-specific basis.
32	DOI value	Approach is acceptable for the FS estimate, but it should also be presumed that if the actual remedy were implemented the depth of impact would be reverified, either through an RA-oriented investigation or during remediation. Dredging would be performed to meet the cleanup levels that are identified in the ROD.
	Overdredge allowance	An overdredge allowance of 1-2 feet is on the high side. Palermo et al. (2008) states:

Slide No.	Issue/LWG Statement	Comment
		"Considering the water depths at most contaminated sediment sites, the size of dredges normally employed, and the precision attainable for positioning the dredgehead, an overdredge allowance for environmental dredging projects of 6 in. is the current "state of the practice."" Adding a 2 ft overdredge allowance to all the estimates will greatly increase dredge volume estimates and related costs over the project area. That procedure will result in a bias against dredging in comparisons of alternatives. Volume estimates do tend to increase between costing and implementation (Palermo and Gustavson 2009), but assigning a large-overdredge allowance without a technical basis is not appropriate.
32-37	Dredge volume development	The adjustment factors presented may be overly conservative such that the volume estimates, and therefore costs are higher than might be necessary, which seems to be a strategy to make dredging seem unattractive.
34	Dredge volume assumptions	It isn't clear why using a flatter side slope would result in less material removed. If the SMA and DOI are constant, a flatter side slope dredged at the SMA footprint should result in more material dredged. The determination of the appropriate side slope angle for dredging should be made on a site-by-site basis.
37	Number of dredge passes	Agree with the suggestion that the number of dredge passes be limited to one cleanup pass, following dredging to the cut line. A similar approach was suggested by the peer reviewers of the Hudson River dredging project.
38	Conclusions	Previous comments regarding pre-screening and cost-prohibitiveness apply.
		It did not appear that dredging without structure removal was considered in the "pre-screen" analysis. Long-reach excavators have been used successfully in projects in the Northwest, such as the Head of Hylebos in Commencement Bay. It is not a requirement to remove and reconstruct structures for dredging; although in some cases it may be appropriate. The universal application of demolition/reconstruction to all structures minus floating dock is not appropriate. That approach results in pre-screening potentially viable options. Whether dredging should be considered around structures should be dictated by site conditions, balancing the benefits of removal with the recognition that dredging around structures is challenging due to underwater obstacles and that removal of sediment can weaken structures.

3. Disposal Site Screening Evaluation

Summary Observations

- This screening would have been far more useful if estimates of dredge volumes were available to compare against the capacity of potential sites. Without this context it's impossible to gauge which options are appropriate. Otherwise, the site-specific understanding of the potential disposal areas to provide further interpretation is lacking.

- It appears that there are sufficient options and storage capacity for the various options that might be considered for sediment disposal in the FS.

Slide-specific Comments

Slide No.	Issue/LWG Statement	Comment
2	Presentation summary	Concur with conclusions. It may be beneficial in the FS to differentiate upland disposal options
7	General viability of CAD	Alternatives should not be eliminated based on perceptions of public acceptability at the screening stage. It is recognized that disposing of that contaminated sediment in the river, even under conservative, protective design, may face significant opposition. We agree potential CADs should be identified in the alternative screening process, and recognize concerns with their general viability.
20	Screening for FS	"Most options should be allowed further consideration at design if proponent can show

Slide No.	Issue/LWG Statement	Comment
	purposes only	consistency with CERCLA and ARARs." This caveat should be generally applied to all disposal options, listed or not. Notes should also contain explanation of permitting requirements related to off-site disposal alternatives.
21	Ross Island assumptions	LWG should provide additional detail on their Ross Island CAD assumptions.

4. Sensitivity/uncertainty analyses and other evaluations to support SMA refinement

Summary Observations

- LWG proposes conducting sensitivity analyses of various input parameters associated with specific chemicals and exposure pathways for the focused PRGs. However, as noted in EPA's comments on the draft BHHRA and during subsequent discussions, the LWG to this point has provided little information as to why alternate values should be considered either equally or more descriptive of the potentially exposed population at Portland Harbor than those values currently used in the risk assessment. The BHHRA already includes a quantitative sensitivity analysis, and EPA has provided LWG with extensive comments. Consistent with EPA guidance, the risk assessment is the appropriate venue for the discussion of uncertainties and associated sensitivity analyses of the assumptions used to derive the risk estimates, and the value of an additional evaluation beyond what is presented in the risk assessment is unclear. The LWG should revise the uncertainty and associated sensitivity analysis in the BHHRA consistent with EPA's comments, and once again note that any quantitative evaluation of uncertainty or sensitivity around various exposure parameters should include a discussion of the basis for the original values, and sufficient justification as to why alternate values are considered equally plausible.

- The LWG's December 14, 2010 presentation on the use of sensitivity and uncertainty analyses to support sediment management area refinement lacks sufficient technical detail to draw substantive conclusions. However, it is not clear why the LWG considers the use of zero as a more appropriate substitution value than one-half the detection limit, or any other potential value between zero and the detection limit. Calculated mean values using replacement for censored data are directly correlated to the fraction of the reporting limit used as a substitute value, and will also be influenced by the degree of censoring in the data set. Using a simulated data set, Helsel (2006) demonstrated that a value of 0.7 x DL yielded the best estimate of the uncensored mean. In any case, the results of the analysis for surface weighted average concentration showed that the differences were within the limits of analytical precision in all but one area. EPA believes the assumptions used in the risk assessment are sufficiently robust to provide a sound basis on which to derive the PRGs to use in the analysis of remedial alternatives in the FS.

- It is recognized that there are numerous parameters and assumptions relating sediment concentrations and human risk. Each of these parameters is uncertain; assigned uncertainty bounds would also be uncertain, and there is uncertainty associated with the model applications. But, uncertainty is not a valid reason for inaction in the face of unacceptable risks relating to environmental contaminants. Rather, risk management decisions that recognize the inevitable uncertainty in conjunction with a remedy implementation/monitoring framework that has explicit goals and timeframes should be employed.

- The presentation listed numerous parameters in the risk assessment to be evaluated in a risk management sensitivity analysis process. These included different approaches for establishing background concentrations, data handling approaches, risk reduction over time approaches, and sensitivity analyses for human health and ecological risk assessments, among others. It was not possible to evaluate these proposals because no details were provided. The single example that was shown with any specifics was the concept of using zero in numerical calculations as a replacement for non-detects instead of using one half the detection limit. This example represents the lowest theoretical result and is clearly biased toward

a low estimate of risk that would thus lead to less protective remedies. As such, this leads to skepticism over the purpose and use of the sensitivity analyses the LWG is contemplating.

Slide-specific Comments

No slide-specific comments are provided. We do not believe the comments are useful until general agreement is reached on the nature and use of the sensitivity analysis.